

REMARKS

This is in response to the Official Action of March 15, 2006. Reconsideration of the elected claims 1-18 is respectfully requested. Claim 19 has been cancelled.

The claims as presented were rejected by the Examiner on a combination of U.S. Patent No. 5,582,235 to Hamilton et al., and Patent No. 5,361,188 to Kondou et al. The rejection, in particular in view of the amended claims is respectfully traversed, in that it is respectfully submitted that a new and non-obvious arrangement has been claimed, for use in a burn-in-oven that is used for testing integrated circuits.

The Office Action stated that the Hamilton et al. patent '235 disclosed substantially the claimed invention. Hamilton '235 does disclose a system for a burn-in-oven that has a plurality of controllable valves that direct flow from individual flow conduits onto separate devices under test, and with the valves being controlled by a controller in response to temperature signals at the devices under test.

However, the Hamilton '235 device illustrates and teaches the use of separate individual conduits carrying flow from a blower through a main conduit, and with the resulting construction, within the teachings of this patent, only of a system of conduits 50, 51, 52 and 53. The flow conduit 53 is connected to the nozzle assemblies 40a-40n. The flow is through nozzles and the type of valve board arrangement claimed herein is not suggested.

The Kondou et al. patent is a computer housing that uses electronic components and circuit devices, and which has a way of cooling the computer components from a single air source in a standard way. A large air plenum is open to the component only through openings in fixed divider boards defining the plenum.

The use of a tray in a burn-in-oven to define a heat exchange chamber and a plenum chamber above the heat exchange chamber for providing a cooling air source, combined with individual valves at openings in the tray, is not shown or suggested in Kondou et al. or Hamilton '235. In the independent claims each opening is associated with one device under test, and the flow is down directly onto the device under test. The flow is not only controlled by the valve that is associated with the respective opening, but it is also controlled in response to temperature of the device under test on which the air from that opening flows. There is no suggestion of providing the openings in the Kondou et al. with valves to maintain the computer circuits at a selected temperature, but rather the openings are there only for keeping the circuits cool.

The combination suggested by the Examiner is not suggested in either one of the references and thus is not obvious. The basic reference, the Hamilton '235 patent, does not in any way suggest the use of a cooling air plenum above the devices under test with openings through a tray forming a wall of the plenum aligned with each of the devices under test, and with a valve that is associated with each opening. There is thus no suggestion of valves on the tray, for controlling the flow through each opening.

The Hamilton '235 patent illustrates and describes a system of conduits that would be used for carrying the flow of a gas, and admittedly the individually nozzles carry air that impinges on the individual circuits. The flow is controlled by a valve in a conduit for each nozzle and not on a tray forming a plenum wall. The provision of a plenum chamber with openings in one wall of the plenum chamber overlying the devices under test that can be placed into a burn-in-oven is not suggested in any manner.

The addition of any types of valves to the Kondou et al. patent is not suggested to those having ordinary skill in the art. In fact, valves to control air flow at each opening in Kondou et al. would defeat the object of maximum cooling to keep the computer circuits from overheating. The Kondou et al. patent is not concerned with maintaining any particular electronic component at any particular temperature, for testing or any other purpose, but is only concerned with dissipating the heat that is generated so that the electronic components do not become overheated. In other words, there would be no reason or desire to provide for a controlled flow of air onto the component shown in the Kondou et al. patent to regulate the temperature of such components because any restriction in the openings would only defeat the overall desire for cooling air to pass over those components. In the Kondou et al. disclosure, the intent is to maintain an adequate flow of air so that the overall cooling of the electronic components as they are utilized for the computer, is sufficient to ensure that they do not become overheated or damaged.

The concept or basis for the cooling arrangement in the Kondou et al. patent is substantially different from that where a particular device is being tested in a burn-in-oven to insure operability at raised temperatures. The temperature of the device itself is important in the test procedures used in burn-in-ovens.

While the concept of maintaining temperature of devices under test is present in the Hamilton '235 patent, that is, the device under test is maintained at a desired temperature, the structure for doing so is substantially different, as recognized by the Examiner due to the attempt to show that a combination of the Kondou et al. patent and the Hamilton '235 patent would render the claimed invention obvious.

Claim 1 has been amended to indicate more clearly that there is a "separate individual opening in the tray overlying

each of the integrated circuits" that is being tested. Further, "a separate, individually controlled valve on the tray" controls flow through the individual openings, and this flow is directed to an associated integrated circuit.

Likewise, the flow from the first plenum chamber is directed to each associated integrated circuit.

There is no teaching in the Kondou et al. patent that there should be any such flow control valve that would form a path for air flow through any walls of the plenum chambers in the computer of Kondou et al.

Therefore, it is respectfully submitted that claim 1 defines a non-obvious invention over a combination of Hamilton '235 and the Kondou et al. patents.

Claim 2 adds details to the valving construction, and is allowable with claim 1.

Claim 3 utilizes a particular construction of a rotatable valve, and while the Examiner cited the Yoo Patent No. 6,698,718 as showing this type of valve, it is respectfully pointed out that in Yoo in particular, this type of valve is not associated with any circuit testing arrangement or burn-in-oven, but is rather for use with a rapid thermal processing reactor that is used to apparently reduce the amount of time that a semiconductor device is exposed to high temperatures during processing. Certainly, it is a rotary valve, but there is no teaching that this type of valve would be of use in a burn-in system where there is an individual opening in a tray overlying the devices under test and that the valve is on the tray and controls flow through that opening from a plenum chamber to the device under test.

Claim 4 depends from claim 2 and specifies the electric motor that drives each valving element along with the controller to position the valving element. Claim 5 includes a further

sensor for sensing a temperature of the integrated circuit to make the overall combination very precise.

Independent claim 6 is allowable for the same reasons as set forth in connection with claim 1, and now clearly specifies that each one of the plurality of outlet openings through the valve tray is aligned with a device under test, and the valves that are mounted are at each of the outlet openings for controlling a flow onto an associated device under test. Again, while the Hamilton '235 patent shows nozzles and a conduit arrangement, the use of the plenum chamber with the tray wall that has openings or holes aligning with devices under test, and with a valve controlling the flow through such openings, is not shown in Hamilton '235. For the reasons set forth above the structure of claim 6 is not suggested as part of a combination by adding in the Kondou et al. patent. Claims 7, 8 and 9 deal with the use of valve elements, and are allowable with claim 6.

Claim 10 is specific to the source of cooling air that is an air supply chamber at one end of a oven supporting the air flow control plenum. This provides for an overall pressurized source of air to the plenum, while the individual flows are controlled by valves in the tray above the devices under tests. This is clearly contrasted with any teaching added by the Kondou et al. patent because Kondou et al. has no way of controlling the individual flow nor is there is any need to do so, which it is respectfully requested indicates that a combination between Kondou and Hamilton '235 is not something that is obvious.

Claim 11 is specific to a series of vertically stacked air flow control plenums in an oven, which is a combination of all of the elements.

Claim 12 has been amended to more specifically, and inventively define the use of the valves, with the temperature sensors controlling the flow through each of the openings of the valve tray between the cooling air plenum and the burn-in-board

below the opening. Claim 12 is thus allowable for the reasons set forth above.

The dependent claims that depend from claim 12 deal with the use of the holders that support integrated circuits, and includes claim 13, which is allowable with claim 12. Claim 14 adds structural features to the blower for providing a flow of cooling air to the cooling air plenums, and includes a flow passageway from the blower to an inlet and the cooling air plenum.

Claim 15 deals with an air exhaust at the end of each space between the valve tray and the underlining burn-in-board tray, and is allowable with claim 12. Claims 16, 17 and 18 deal with the walls forming the cooling air plenum, and in particular claim 16 connects the walls to the respective valve tray so that they will move with the valve tray, and when the valve tray is removed these walls will also be removed.

Thus, it is respectfully submitted that the amended claims define over a combination of the references cited, in that the use of rotary valves, or valves of any type, would be contrary to the desires of the cooling effects in the Kondou et al. patent. Even if the combination was made, the Kondou patent would have to be substantially reconstructed to comply to incorporate the teachings of air flow conduits and nozzles. It is respectfully submitted that there is no reason for the inventors of Kondou et al. to want to limit or control the air flow onto the individual electronic components that are being operated, because the maximum cooling effect would be desired.

Favorable action is therefore respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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